JOURNAL OF APPLIED MECHANICS AND TECHNICAL PHYSICS

Volume 35, Numbers 1-6, 1994

(A translation of *Prikladnaya Mekhanika i Tekhnicheskaya Fizika*)

Engl./Russ.

Volume 35, Number 1, January-February, 1994

Closure of the Hydrodynamic Theory of Wetting in a Small-Scale Region - O. V. Voinov 1 3
Modeling of a Monosilane rf-Discharge Plasma - V. A. Shveigert, M. I. Zhilyaev, and I. V. Shveigert 13 13
Modeling of the Dynamics of the Change in the Index of Refraction during Resonance Interaction of Radiation with Vibrational-Rotational Transitions - V. I. Grabovskii and A. M. Starik 21 21
Internal Solitary Waves and Smooth Bores which are Stationary in a Laboratory Coordinate System - N. V. Gavrilov 29 29
Discrete Nonlinear-Dispersion Shallow-Water Model - A. M. Frank 34 34
Turbulent Free Convection in a Vertical Layer under Unstable Stratification Conditions - A. G. Kirdyashkin, D. A. Fursenko, and I. B. Fursenko 43 42
Efficiency of a Protective Gas Film with High Injection Ratios in a Highly Turbulent Main Flow - V. P. Lebedev, V. V. Lemanov, S. Ya. Misyura, and V. I. Terekhov 49 48
Calculation of the Velocity Profile in a Nonlinear Wave in a Fluid Layer Flowing down a Vertical Wall - P. I. Geshev and Kh. Kh. Murtazaev 53 53
Accuracy of Asymptotic Solutions for Nonuniform Supersonic Flow Past a Blunt Body - N. N. Pilyugin, R. F. Talipov, and S. V. Utyuzhnikov 61 61
Two Forms of Liquid Separation from a Smooth Surface - S. K. Betyaev, A. M. Gaifullin, and S. V. Gordeev 66 66
Computational Analysis of a Spatial Compressed Turbulent Boundary Layer on the Upwind Side of Delta Wings under Supersonic Flow - V. N. Vetlutskii and T. V. Poplavskaya 69 68
Space-Time Structure of a Trail behind a Heated Cylinder - A. B. Ezerskii, M. Gharib, and M. Hammache 75 74
Stability of a Solid in a Vortex Flow of Ideal Liquid - V. A. Vladimirov and K. I. Il'in 84 83
Conditions for Finite Signal Speed in Relaxational Infiltration - O. Yu. Dinariev 93 92
Structure and Dynamics of the Slow Pressure Wave in a Porous Medium Saturated with a Liquid Containing Gas Bubbles - V. E. Dontsov and V. A. Maslov 97 95
Planar Deformation in Geometrically Nonlinear Elasticity - V. D. Bondar' 100 99
Optimization of a Layered Spherical Inclusion in an Infinite Matrix with Uniaxial Tension - V. V. Alekhin 117 115
Calculation of Elastoplastic Strains in a Multicomponent Polycrystalline Material - O. A. Volokhovskaya and V. V. Podalkov 123 121
Small-Diameter Structure with Unilateral Inside Contacts - A. G. Kolpakov 131 128
Safety Factors and Reliability of Large Structures - A. G. Ivanov and V. A. Ryzhanskii 139 135
Evaluating the Residual Strength of Shells of Laminated Composites with Through-Slit-Type Defects - A. V. Abramenko and V. N. Maksimenko 143 140
Flat Rigid Die under a Transverse Load - V. A. Babakov, V. A. Kolodko, and S. B. Stazhevskii 150 147
Electron-Beam Diagnostics of Hydrogen Fluoride. Optical Model and Its Limitations - G. G. Gartvich, A. E. Zarvin, and V. Zh. Madirbaev 155 151

Volume 35, Number 2, March-April, 1994

Formation of a Weakly Oscillating High-Power Flow of Relativistic Electrons with Strong Magnetic Compression - Yu. D. Grom, I. A. Kremer, V. N. Manuilov, V. E. Nechaev, and M. V. Urev	163	5
Study of the Radiation Charging of Dielectrics by Ions - K. A. Dergobuzov and A. P. Yalovets	169	11
Regular Reflection of a Shock Wave from a Wall with a Bend - S. V. Voshchin	175	18
Interaction of a Shock Wave with a Cloud of Particles of Finite Dimensions - V. P. Kiselev, S. P. Kiselev, and V. M. Fomin	183	26
Steady Thermomagnetohydrodynamic Flows of a Conducting Gas in Strong Magnetic Fields with Allowance for the Hall Effect - I. V. Krasnoslobodtsev	193	37
Calculating the Evolution of Coagulating Systems - E. V. Semenov	201	45
Is Spontaneous Swirling of Axisymmetric Flow Possible? - B. A. Lugovtsov	207	50
Influence of Surface-Active Agents on the Thinning of a Vertical Liquid Film - L. K. Antanovskii	211	54
Supercritical Thermocapillary Convection Regimes in a Liquid Layer "On the Ceiling" - L. G. Badratinova and S. G. Slavchev	216	58
Aerodynamic Characteristics of a Delta Wing in Hypersonic Flow - V. Ya. Kiselev, A. A. Maslov, and A. N. Shiplyuk	224	66
Effect of Coarse Impurity Particles on Turbulent Characteristics of Gas Suspensions - I. V. Derevich	228	70
Model Investigations of Wave Formation in Solid Ice Cover from the Motion of a Submarine - V. M. Kozin and A. V. Onishchuk	235	78
Some Exact Solutions of the Displacement Problem when Filtering a Gas-Condensate Mixture - O. Yu. Dinariev	239	82
Pressure Filtration in a Cracked and Porous Stratum - A. M. Ametov	243	85
Interaction of Nonlinear Waves in Materials with Elastoplastic Behavior - N. N. Myagkov	246	88
Elastic Wave Polarization and Velocity in Materials with Stress-Induced Anisotropy - A. F. Glebov	257	101
Nonstationary Problems of the Quasistatic Theory of a Hardening Elastic Body - A. L. Maksimenko and E. A. Olevskii	263	106
Inhomogeneous Inclusion in an Anisotropic Elastic Medium - G. N. Mirenkova and É. G. Sosnina	269	113
Energy-Wave Approach in the Mechanics of Brittle Dynamic Fracture - A. G. Kotousov	274	118
Relationship between the Acoustic Properties of the Burner Head and Combustion Chamber and Transverse Vibrations Excited in a Gas - B. I. Malinin	279	123
Postbuckling Behavior of an Ideal Bar on an Elastic Foundation - N. S. Astapov and V. M. Kornev	286	130
Calculation of Plane Equilibrium Shapes of Thin Rods by the Method of Self-Equilibrating Variances - Yu. M. Volchkov, G. V. Ivanov, and O. N. Ivanova	297	142
Parabolic Approximation to the Theory of Transverse Vibrations of Rods and Beams - V. V. Nesterenko and A. M. Chervyakov	306	151
Stressed-Construction Rigidity Characteristics - A. G. Kolpakov	310	155
Design and Testing of High-Pressure Covers - A. G. Fedorenko, A. G. Shimarov, and M. A. Syrunin	319	163

Volume 35, Number 3, May-June, 1994

Effect of Longitudinal Aberration in an Ion-Optical System on the Properties of a Focused Beam - V. N. Getmanov, I. M. Ikryanov, and O. Ya. Savchenko	325	3

	Engl.	Russ.
Ultimate Velocities of Plates Accelerated by Magnetic Field - S. V. Stankevich and G. A. Shvetsov	336	13
Relaxation Oscillations of a Nonequilibrium Gas Filling a Variable-Area Channel - A. N. Bogdanov	345	22
Generation of Long Waves by the Bottom Contour in a Two-Layer Flow - V. N. Lyapidevskii	355	34
Effect of Anomalous Dispersion Dependences on Scattering and Generation to Internal Waves - I. V. Sturova	366	47
Unique Features of the Aerodynamics Problems for a Wing of Finite Span - N. F. Vorob'ev	373	55
Wind Tunnels for Hypersonic Research (Progress, Problems, Prospects) - M. E. Topchiyan and A. M. Kharitonov	383	66
Waveriders Constructed on Flows Following Shock Waves in the Form of Elliptical Cones - V. I. Voronin and A. I. Shvets	396	81
Dynamics of Capillary Waves on a Bubble Performing Nonlinear Pulsations in a Low-Viscosity Liquid - O. V. Voinov	401	87
Lifetime of a Symmetrically Pulsating Bubble - O. V. Voinov	411	97
Evaporative Mechanism of Cluser Generation by a Solid Surface Bounded by Vapor - A. A. Bochkarev and M. V. Pukhovoi	416	102
Modeling the Aerodynamic Drawing of a Viscoelastic Fluid by the Thin Nonisothermal Jet - A. L. Kalabin	425	112
Dynamic Fracture and Scale Effects (Survey) - A. G. Ivanov	430	116
An Energy Approach to the Solution of the Nonlinear Boundary-Value Problems of the Nonclassical Theory of Anisotropic Stratified Shells with Slit-Cracks - V. N. Yurkov	443	131
Anisotropy from Slippings - V. M. Zhigalkin and B. A. Rychkov	447	136
Determining the Elastic Characteristics of Homogeneous Anisotropic Bodies - I. Yu. Tsvelodub	455	145
Low-Stress State in an Inhomogeneous Compound Wedge with Mixed Boundary Conditions - A. G. Akopyan	459	149
Most Efficient Way of Mixing Powders - A. F. Revuzhenko	467	156
Distribution of Stresses in Elastic Strongly Anisotropic Material - Yu. A. Bogan	476	168
Use of a Charge-Exchange Process in Spectral Diagnostics of Plasma Streams - Yu. P. Zakharov, O. M. Orishich, V. N. Snytnikov, and I. F. Shaikhislamov	481	174

Volume 35, Number 4, July-August, 1994

	Engl.	Russ.
Cooled Cylindrical Langmuir Probe in a Slowly Moving Plasma - Z. M. Egorov and A. V. Kashevarov	487	3
Thermal Explosion of a Rising Flow of Liquid in a Ring Channel - T. A. Bodnar'	496	12
Numerical Investigation of Deuterium Implosion in a Conical Target - A. A. Charakhch'yan	506	22
Optimum Forms of Three-Dimensional Bodies for Penetration of Dense Media - N. A. Ostapenko, V. I. Romanchenko, and G. E. Yakunina	515	32
Two-Velocity Hydrodynamics and Thermodynamics - S. M. Shugrin	522	41
Dissipative Two-Velocity Hydrodynamics - S. M. Shugrin	538	59
Instability of a Self-Gravitating Compressible Medium - Yu. G. Gubarev	546	68
Acoustic Resonance in Turbomachinery with Aerodynamic Interaction of the Cascades in Subsonic Gas Flow - V. L. Khitrik	556	78
Airfoil Cascade in Unsteady Eddy Flow - V. A. Yudin	563	85
Discharge of a Gas-Saturated Liquid Through a Nozzle - V. F. Karimov and V. Sh. Shagapov	569	91

	Engl.	Russ.
Mechanics of Suspensions of Rigid Uniaxial Dumbbells in an Anisotropic Liquid - E. Yu. Taran, Yu. V. Pridatchenko, and V. S. Volkov	577	99
Numerical Simulation of Combined Heat Transfer in a Planar Layer on a Net Having an Arbitrary Thickness Step - V. P. Zamuraev	584	107
Studying Heat Exchange of Dispersion-Drop Gas–Liquid Flow in Granular Layer - N. A. Kuzin, V. A. Kuz'min, A. V. Kulikov, and A. B. Shigarov	594	118
Numerical Modeling of Heat and Mass Transfer in Fiber Bundles with Liquid Evaporation on Their Surfaces - V. I. Eliseev and Yu. P. Sovit	598	123
Calculation of Spatial Equilibrium Forms for Thin Elastic Rods by the Self-Equalizing Discrepancy Method - G. V. Ivanov and O. N. Ivanova	605	130
Derivation of Equations for a Layer of Variable Thickness Based on Expansions in Terms of Legendre's Polynomials - A. E. Alekseev	612	137
Effect of the Anisotropy of Macromolecular Tangles on the Nonlinear Properties of Polymer Liquids Stretched Along a Single Axis - G. V. Pyshnograi	623	147
Determination of the Kinetic Strength Constants and of the Critical Size of Destruction of Composite Materials on the Basis of Recording of Pulse Electromagnetic Radiation During Their Destruction - V. V. Ivanov, P. V. Egorov, V. I. Klimov, L. A. Kolpakova, A. A. Malyshin, L. F. Tugolukova, V. V. Yunnikov, and V. P. Berveno	628	153
Buckling of a Ductile Column under Rigid Loading - M. N. Kirsanov	634	159
Effect of Shear Strength on the Development of Instability During the Deceleration of Imploding Casings - A. G. Ivanov, V. A. Ogorodnikov, G. Ya. Karpenko, A. D. Kovtun, A. A. Demidov, and L. A. Tolstikova	639	163

Volume 35, Number 5, September-October, 1994

	Engl.	Russ.
Light-Induced Drift of a One-Component Gas in a Flat Channel - V. G. Chernyak, I. V. Chermyaninov, E. A. Vilisova, and E. A. Subbotin	643	3
Structure of the Plasma Jet of a Pulsed Erosional Electric-Discharge Source - S. B. Leonov and G. A. Luk'yanov	653	13
Features of Shock Wave Formation in Soft Materials Generated by Impact of a Plate - N. Kh. Akhmadeev and R. Kh. Bolotnova	658	19
Numerical Study of Turbulent Flow of Partly Ionized Air in a Viscous Shock Layer - V. L. Kovalev and A. A. Krupnov	665	27
Planar Problem of Hydrodynamic Shaking of a Submerged Body in the Presence of Motion in a Two-Layered Fluid - I. V. Sturova	670	32
Numerical Analysis of the Asymptotic Representation of Solitary Waves - E. A. Karabut	680	44
Numerical Simulation of Vibrational Relaxation Processes in Unsteady Gas Jets - É. I. Vitkin, A. A. Kirillov, and L. T. Perel'man	690	55
Optical Recording of Shear Flow of a Nematic Liquid Crystal in a Gasdynamic Flow - G. M. Zharkova and S. I. Trashkeev	695	60
Behavior of Suspensions under Dynamic Loading - S. V. Stebnovskii	704	68
Interaction of Pressure Waves with a Wet Foam - A. B. Britan and I. N. Zinovik	712	78
Influence of the Gas Flow Rate on the Drawing of Optical Fibers from Fluoride Glasses - M. V. Gorbunov	718	84
Generation of Waves in a Layered Medium Containing a Local Defect - A. A. Lyapin	722	87
Description of the Creep Process and Long-Term Strength by Equations with One Scalar Damage Parameter - B. V. Gorev and I. D. Klopotov	726	92
Formation of the Microstructure of a Composite during Its Dynamic Loading - S. N. Kul'kov, S. F. Gnyusov, and L. M. Molchunova	735	102

	Engl.	Russ.
Buckling of a Bar on an Elastic Base - N. S. Astapov, A. G. Demeshkin, and V. M. Kornev	739	106
Stress-Deformed State of a Semi-Infinite Ice Sheet under the Action of a Moving Load - V. D. Zhestkaya and V. M. Kozin	745	112
Determination of the Breaking Load and the Position and Direction of a Fracture Using the Gradient Approach - M. A. Legan	750	117
Antiplane Deformation of a Plane with a Slit Filled with a Material with a Low Shear Modulus - Yu. A. Bogan	757	125
Singular Points of Deformation Process and Creep Buckling of a Cylindrical Shell - M. N. Kirsanov and V. D. Klyushnikov	761	128
Approximate Method for Solving Relaxation Problems in Terms of Material's Damagability under Creep - A. F. Nikitenko and I. V. Sukhorukov	770	136
Numerical Method of Solving the Problem of the Contact of an Elastic Plate with an Obstacle - V. A. Kovtunenko	776	142
Effect of the Direction and Magnitude of an External Stress Field on the Trajectory of a Star-Shaped System of Cracks - G. V. Basheev, P. A. Martynyuk, and E. N. Sher	781	147
Features of the Change in the Frequency Spectrum of Electromagnetic Radiation during the Fracture of Rock Specimens - G. I. Kulakov and G. E. Yakovitskaya	793	160
Toward a Theory of the Propagation of Elastoplastic Waves in Strain-Hardening Media - V. M. Sadovskii	798	166
Kinetics of the Collision of Metallic Plates in a Multilayer Packet during Explosion Welding - S. V. Kuz'min, V. I. Lysak, and D. V. Starikov	805	173

Volume 35, Number 6, November-December, 1994

	Engl.	Russ.
Evaluation of the Seismic Effect of an Underground Explosion - A. S. Bykovtsev and D. B. Kramarovskii	809	3
Dynamics of Unstable Oscillations in a Supersonic Jet - N. M. Terekhova	817	11
Long Waves in an Eddying Barotropic Liquid - V. M. Teshukov	823	17
Problem of the Interaction between a Supersonic Flow and a Cloud of Particles - V. F. Volkov, A. V. Fedorov, and V. M. Fomin	832	26
Conditions for Oscillations in a Tube with an Inlet Gas Flow - V. S. Demin and S. A. Gaponov	837	31
Nonlinear Oscillations of a Gas in a Closed Tube - A. A. Aganin and M. A. Il'gamov	844	39
Asymptotic Model of Active Resonance Absorber of Acoustic Vibrations in a Closed Region - V. B. Kurzin	849	44
Spiral Waves on the Surface of a Film Draining along the Surface of a Vertical Cylinder - O. Yu. Tsvelodub	861	56
Compensation Effect in Gasdynamic Separation of Mixtures - S. V. Dolgushev and V. M. Fomin	869	63
Dynamics of a Viscous Liquid Wetting a Solid via van der Waals Forces - O. V. Voinov	875	69
Model of the Motion of a Two-Component Liquid with Allowance of Capillary Forces - V. N. Starovoitov	891	85
Model of Turbulent Viscosity for Computation of Three-Dimensional Turbulent Boundary Layers - S. I. Shpak	898	92
Experimental Study of Spectra Corresponding to Friction Stress and the Third Statistical Moments in Fully Developed Turbulent Pipe Flow - P. G. Zaets, A. T. Onufriev, N. A. Safarov, and R. A. Safarov	906	99
Model of the Deformation of a Liquid Droplet in a Gas Flow - D. A. Detkovskii and S. M. Frolov	911	105

Uniform Deformation of a Granular Medium. Theory and Experiment - D. Kolymbas, S. V. Lavrikov, and A. F. Revuzhenko 920 114
Momentless Model of the Elastoplastic Deformation and Limiting State of Thin Interlayers - G. V. Ivanov and V. D. Kurguzov 928 122
Numerical Modeling of Stress States in Two-Dimensional Problems of Elasticity by the Layers Method - Yu. M. Volchkov, L. A. Dergileva, and G. V. Ivanov 936 129
Boundary-Value Problem of Dynamic Geometrically Nonlinear Elasticity - V. D. Bondar' 942 135
Equations of the Linear Theory of Elasticity of Anisotropic Materials, Reduced to Three Independent Wave Equations - N. I. Ostrosablin 949 143
Variational Problems with a Samll Parameter in the Theory of Elasticity - Yu. A. Bogan 957 151